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# FOREST INSECT SURVEYS

OCHOCO NATIONAL FOREST  
AND ADJACENT TIMBERLANDS

1945 - 1954



U. S. DEPARTMENT OF AGRICULTURE · FOREST SERVICE  
PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION  
R. W. COWLIN, DIRECTOR

PORTLAND, OREGON



APRIL 1955

PREPARED BY THE DIVISION OF FOREST INSECT RESEARCH

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Field and Office Work on Ochoco National Forest Surveys

By

Numerous field assistants of the former Bureau of Entomology and Plant Quarantine listed in Table 3. Acknowledgement is made to personnel of the regional office, National Forest Administration, Region 6, and the forest Supervisors and their staffs of the Ochoco National Forest and the Oregon State Board of Forestry for assistance in conducting these surveys.

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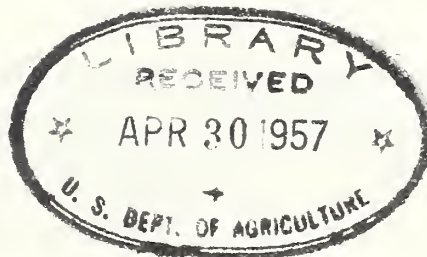
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By  
W. J. Buckhorn  
Entomologist



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## SUMMARY

The results of two types of cooperative forest insect surveys on the Ochoco National Forest and adjacent timberlands are here reported: (1) Surveys on pine beetle check plots during the period 1945-1953, and (2) aerial and ground surveys during the period 1952-1954.

Of the 13 virgin pine beetle check plots cruised in 1945, only 3 remained in 1954. During this 9-year period, average check plot losses declined from 85 board feet per acre in 1944 to an all-time low of 23 board feet per acre in 1948. From 1949 to 1953, pine beetle losses increased each year, reaching a peak of 96 board feet per acre in 1952. In 1953 these losses again declined. Partial check plot data and general observations in 1954 indicated that this downward trend was continuing.

In 1952 and 1953 pine beetle infestations over the area as a whole ranged from light to moderate intensity. In 1954, only light infestations were found on the area.

Spruce budworm infestations of varying intensities were recorded on 231,380 acres in 1954. Trees are now in critical condition from repeated defoliations. To prevent wholesale destruction of the stands, measures have been recommended to control the budworm in 1955.



## FOREST INSECT SURVEYS

### OCHOCO NATIONAL FOREST AND ADJACENT TIMBERLANDS

1945 - 1954

#### INTRODUCTION

Depredations by the western pine beetle in the virgin stands of ponderosa pine within and adjacent to the Ochoco National Forest became serious in 1931. In order to measure these losses, systematic surveys were started in the fall of 1932. These surveys have been conducted annually, except during 1946 when manpower was not available. They have been carried out as a cooperative project between the U. S. Forest Service and the former Bureau of Entomology and Plant Quarantine. The last report on these surveys covered the 1945 survey (table 4).

The purpose of this report is to summarize the results of surveys conducted during the period 1945-1953. Generalized bark beetle conditions during the period 1951-1953 and the spruce budworm situation since 1947 are discussed.

#### SURVEY METHODS

##### Pine Beetle Check Plot Surveys

These annual surveys consist of a 100 percent cruise of all ponderosa pine timber losses on representative 320-acre plots in virgin stands. Four lines, 10 chains apart and one mile long are run through each plot and pertinent data are recorded for each insect-killed tree. Data on windthrow are also recorded on these plots. Since only a portion of the current season's loss has developed at the time of survey, the loss record is not completed until the remaining portion of the loss is picked up on the following season's survey. As the plots were not cruised in 1946 the partial 1945 loss and all of the 1946 loss was recorded on the 1947 survey. The 1954 survey completed the 1953 loss data and a partial record was obtained of the 1954 loss.

The progress of logging operations has reduced the 13 plots cruised in 1947 to 3 plots in 1954. No data have been taken on cutover stands, except in the Snow Mountain area where four 160-acre plots were established in 1949 and have been periodically cruised to determine losses in selectively cut stands. The results of cutover surveys will be reported separately.



The plots have been cruised by three-man crews (a compassman and two spotters), which, since 1948, have operated under the direction of J. M. Whiteside. Personnel of the survey crews from 1947 through 1954 are shown in table 3. Thirty-eight men have participated in the surveys on the forest during this period.

#### Aerial and Ground Surveys

Prior to 1947, some idea of general conditions on the forest was obtained while traveling to and from the plots, from lookouts, or from other vantage points. Since 1947, insect conditions in all timber types on the forest have been viewed from the air as part of the annual cooperative region-wide aerial survey. Starting in 1950, the aerial survey data have been presented in generalized reports on insect conditions for the region. The aerial survey flight lines are flown in a north-south direction approximately 4 to 6 miles apart over rolling country and on a contour up and down drainages over more rugged terrain. The aerial survey team consists of a pilot and two observers who sketch-map all insect damage in place with regard to intensity, area affected, insect species responsible, and timber species affected. Results of aerial surveys are verified by careful ground examinations of infestation centers, particularly those about which there is some doubt. Mr. W. J. Buckhorn has been the Chief Observer and has been responsible for this phase of the survey.

### RESULTS OF PINE BEETLE CHECK PLOT SURVEYS, 1946 - 1954

#### Primary Insects

Practically all insect-caused mortality in the ponderosa pine stands resulted from attacks by the western pine beetle. Other insects causing some mortality, either alone or working in conjunction with the western pine beetle, were: the mountain pine beetle, pine engraver beetle, and California flatheaded borer.

#### Check Plot Losses

Losses caused by pine beetles on the individual check plots during the period 1945-1953 inclusive are presented in table 1.

Only 3 of the 13 plots which were cruised in 1945 had complete records during this nine year period. The gross percent of stand lost on each of the three plots during the nine year period was as follows: Dry Creek 5.33%; Black Mountain 4.43%; and 760 Spring 2.69%.





### Infestation Trends on Check Plots

During the eight-year period 1945-1953, the trend of pine beetle infestations fluctuated widely on the check plots. In 1945 the trend began to decline from a peak reached in 1944 when plot losses averaged 85 board feet per acre. The trend continued downward, reaching an all-time low in 1948 with an average loss of 25 board feet per acre. Starting in 1949, the infestation trend began to rise and continued to increase steadily through 1952 when losses averaged 96 board feet per acre. The infestation declined abruptly during 1953 and the partially completed survey data for 1954 indicate that the infestation remained more or less static during 1954.

The trend of losses caused by pine beetles from 1932 to 1953 inclusive is shown graphically in figure 1.

### GENERAL FOREST INSECT CONDITIONS, 1952 - 1954

During the course of the annual cooperative regional aerial and ground survey project, infestation of all major forest insects are mapped-in-place by the observers. Most of these centers of infestation are ground checked to verify the findings, especially those about which doubt exists. Maps, on a quarter-inch scale, showing the centers of infestation recorded during the surveys of 1952-1954 have been sent to the Forest Supervisor as an aid in planning timber sales.

A summary of bark beetle infestations recorded during the surveys of 1952-1954 and spruce budworm infestations from 1947 to 1954 is presented in table 2. A brief discussion of 1954 survey findings is as follows:

1. Douglas-fir beetle - While Douglas-fir beetle activity declined considerably over much of the forest it continues to be active in stands weakened by repeated defoliations of the spruce budworm. This situation will bear careful watching as an aggressive epidemic could quickly develop in these weakened stands. The dead and dying trees should be salvaged wherever possible to aid in reducing the beetle population. One center of infestation covering 360 acres was observed in 1954 on the north side of Stephenson Mt.
2. Mountain Pine Beetle - Two centers of damage totaling 640 acres were recorded in 1954. Both centers, one near Toggle Meadows and the other near Burnt Cabin Creek, are in isolated stands of lodgepole pine. Control is unnecessary.





3. Western Pine Beetle - The downward trend of infestation from the high point reached during 1952 was apparent over the entire forest. Centers of aggressive infestations present in 1953 declined and only light infestations totaling 33,980 acres were found on the 1954 aerial survey. The largest center is located in the upper basin of Emigrant Creek. Another sizeable center was present on Pine Creek on Maury Mt. Salvage of the infested trees is recommended.
4. Spruce Budworm - The first recorded outbreak of the spruce budworm on or adjacent to the Ochoco National Forest was in 1931 in the Douglas-fir and true fir stands south of Mitchell, Oregon. This outbreak subsided without causing material damage to the stands. The insect was not found again until 1947 when two small centers appears on Snow Mt. This infestation vanished in 1948 but in 1949 new outbreaks appeared in various locations along the north side of the forest. Since then the infestation has increased in both extent and intensity.

Because of the fluctuating nature of this infestation, it was hoped that it would subside from natural causes. However, the situation has become more acute and 231,380 acres of epidemic infestation were recorded in 1954. Repeated defoliations have begun to have serious effects on the stand. Top-killing and serious weakening of old and young growth trees and killing of seedling and sapling stands are in progress. To prevent extensive destruction, control measures have been recommended and are planned for 1955.

#### RECOMMENDATIONS

Forest insect surveys on the Ochoco National Forest in 1954 have shown an endemic bark beetle situation and a continuing epidemic spruce budworm infestation. The following recommendations are made with respect to these conditions.

1. Aerial spraying with DDT insecticide for control of the spruce budworm has been recommended and is planned for the northern portion of the forest in 1955.
2. Salvage of infested ponderosa pine and Douglas-fir whenever possible to reduce the beetle population and to utilize the dead timber.
3. Surveys on the remaining pine beetle check plots in virgin stands and those in selectively cutover stands should be continued.
4. Aerial and ground surveys, as previously conducted, should be continued.



Table 1.

INSECT KILLED TIMBER ON 320 ACRE PONDEROSA PINE  
VIRGIN CHECK PLOTS - OCHOCO NATIONAL FOREST & ADJACENT PRIVATE LANDS  
1945 - 1953

Check Plot Area, Plot & Location	Ponderosa Pine		No. of Trees	Volume (Board Feet)			Ratio to Previous Year
	Acres	Volume MBM	Year	Total	Per Acre	% of Stand	
<u>Mitchell Area</u>							
Spanish Peak	310	4376	1945	19,530	63	.45	.96
T13S, R24E			1946	11,460	37	.26	.59
Sec.23 S/2			1947	5,040	16	.12	.44
			1948	3,130	10	.07	.62
			1949	4,170	13	.10	1.33
			1950	22,030	71	.50	5.28
			1951	2,390	8	.05	.11
			Total	67,750	218	1.55	
			Av.	9,678	31	.22	
<u>Prineville Area</u>							
Stevenson T11S, R18E, Sec.36 E/2	320	4500	1945	20,470	64	.45	1.14
			1946	22,750	71	.51	1.11
			1947	15,620	49	.35	.69
			1948	9,900	31	.22	.63
			1949*	1,950	6	.04	.20
			Total	70,690	221	1.57	
			Av.	11,782	37	.26	
<u>Dry Creek</u>							
T13S, R17E	320	2757	1945	20,640	65	.75	1.42
Sec.29 E/2			1946	10,260	32	.37	.50
			1947	1,410	5	.05	.14
			1948	4,430	14	.16	3.14
			1949	15,710	49	.57	3.55
			1950	29,310	92	1.06	1.87
			1951	32,630	102	1.18	1.11
			1952	17,830	56	.65	.55
			1953	15,040	47	.54	.84
			Total	147,260	462	5.33	
			Av.	16,362	51	.59	

\* Estimated



Table 1 (Continued)

Check Plot Area, Plot & Location	Ponderosa Pine		No. of Trees	Volume (Board Feet)			Ratio to Previous Year
	Acres	Volume MBM		Total	Per Acre	% of Stand	
Wildcat T13S, R18E Sec. 5 W/2	320	3409	1945	27,240	85	.80	1.78
			1946	11,160	35	.33	.41
			1947	11,670	36	.34	1.05
			1948	10,170	32	.30	.87
			1949*	10,000	31	.29	.98
			Total	70,240	219	2.06	
Summit Prairie Area Black Mountain T14S, R22E Sec. 9 W/2	320	3799	Av.	14,048	44	.41	
			1945	15,390	48	.41	.57
			1946	22,010	69	.58	1.43
			1947	14,960	47	.39	.68
			1948	8,810	26	.22	.56
			1949	2,910	9	.08	.33
			1950	17,160	54	.45	5.90
			1951	44,200	138	1.16	2.57
			1952	36,700	115	.97	.83
			1953	6,490	20	.17	.18
			Total	168,630	526	4.43	
			Av.	18,737	58	.49	
Horse Prairie T15S, R21E Sec. 29 E/2	320	2965	1945	9,280	29	.31	.71
			1946	7,970	25	.27	.86
			1947	2,500	8	.08	.31
			1948*	13,000	41	.44	5.20
			Total	32,750	103	1.10	
			Av.	8,187	25	.27	

\* Estimated





Table 1. (Continued)

Check Plot Area, Plot & Location	Ponderosa Pine		Year	No. of Trees	Volume (Board Feet)		Ratio to Previous Year
	Acres	Volume MBM			Total	Per Acre	
Paulina Butte T14S, R23E Sec. 32 E/2	320	2614	1945	15	32,230	101	2.63
			1946	4	1,020	3	.03
			1947	10	9,410	29	9.23
			1948	5	7,940	25	.84
			1949	3	1,120	4	.14
			1950	26	33,630	105	30.04
			1951	33	33,130	103	.98
			Total	96	118,480	370	
			Av.	13.7	16,926	53	
760 Spring T14S, R26E Sec. 7 S/2	320	5605	1945	16	17,760	55	1.05
			1946	5	4,010	13	.23
			1947	6	4,290	13	1.07
			1948	5	7,070	22	1.65
			1949	4	11,190	35	1.58
			1950	22	26,140	82	2.34
			1951	18	24,080	75	.92
			1952	34	40,740	127	1.69
			1953	9	15,170	47	.37
			Total	114	150,450	469	
			Av.	12.6	16,717	52	
Sunflower T16S, R26E Sec. 33 W/2	304	3192	1945	14	9,610	32	1.22
			1946	12	12,430	41	1.29
			1947	5	5,240	17	.42
			1948	6	6,010	20	1.15
			1949	16	19,590	64	3.26
			1950	51	37,580	124	1.92
			1951	29	24,040	79	.64
			1952	25	19,770	65	.82
			Total	158	134,270	442	
			Av.	19.7	16,783	55	





Table 1 (Continued)

Check Plot Area, Plot & Location	Ponderosa Pine		No. of Trees	Volume (Board Feet)			Ratio to Previous Year	
	Acres	Volume MBM		Year	Total	Per Acre		% of Stand
Maury Mt. Area								
Double Cabin	320	3121	1945	26,420	83	.85	1.11	
T18S, R20E			1946	8,880	28	.28	.34	
Sec.10 N/2			1947	18,690	58	.60	2.10	
			1948	10,880	34	.35	.58	
			1949	10,560	33	.34	.97	
			1950	19,410	61	.62	1.84	
			1951	24,020	75	.77	1.24	
			1952	37,160	116	1.19	1.55	
			Total	156,200	488	5.00		
			Av.	19,525	61	.62		
	Snow Mt. Area							
	Nicoll Cr.	320	3164	1945	36,630	114	1.19	1.19
T21S, R25E			1946	22,800	71	.74	.62	
Sec.17 W/2			1947	32,400	101	1.05	1.42	
			1948	25,940	81	.84	.80	
			1949*	5,000	16	.16	.19	
			1950	23,810	74	.75	4.76	
			1951	23,880	75	.75	1.00	
			Total	170,460	532	5.48		
			Av.	24,351	76	.78		
	Soda Springs							
T20S, R25E	285	2486	1945	31,100	109	1.25	1.15	
Sec.4 W/2			1946	12,720	45	.51	.41	
			1947	10,290	36	.41	.80	
			1948	2,130	7	.09	.21	
			1949*	1,500	5	.06	.70	
		Total	76,910	202	2.32			
		Av.	15,382	40	.46			

\* Estimated



Table 1. (Continued)

Check Plot Area, Plot & Location	Ponderosa Pine		Year	No. of Trees	Volume (Board Feet)		Ratio to Previous Year
	Acres	Volume MBM			Total	Per Acre	
Bixby Spring	290	2727	1945	24	14,100	49	.55
T20S,R26E			1946	43	14,090	49	.99
Sec.12 S/2			1947	18	12,750	44	.90
			1948*	20	7,500	26	.59
			Total	105	48,440	168	3.03
			Av.	26.2	12,110	42	.75

Year	Area	No. of Plots	Volume MBM	No. of Trees	Total	Per Acre	% of Stand
1945	4,389	14	47,879	369	317,030	72	.66
1946	4,389	14	47,879	281	184,360	42	.38
1947	4,389	14	47,879	257	176,670	40	.37
1948	4,389	14	47,879	188	142,850	32	.30
1949**	3,779	12	42,187	101	88,930	23	.21
1950	2,854	9	31,792	308	232,880	81	.73
1951	2,854	9	31,792	308	232,250	81	.73
1952	1,584	5	18,474	207	152,200	96	.82
1953	960	3	12,161	38	36,700	38	.30
GRAND TOTAL				2,057	1,563,870	505	4.50
Av. per Year				223.5	173,763	56	.50

\* Estimated

\*\* Partly estimated



Table 2.

SUMMARY OF BARK BEETLE INFESTATIONS (1951-1953) AND SPRUCE  
BUDWORM INFESTATIONS (1947-1954) RECORDED DURING AERIAL SURVEYS  
ON OCHOCO NATIONAL FOREST AND ADJACENT TIMBERLANDS

Insect	Year of Damage					
	1953		1952		1951	
	No. Centers	Infested Acreage	No. Centers	Infested Acreage	No. Centers	Infested Acreage
<u>BARK BEETLES</u>						
Douglas-fir beetle	1	360	22	23,090	0	0
Fir engraver "	0	0	3	4,500	0	0
Mt. pine "	2	640	0	0	0	0
Pine engraver "	0	0	28	4,390	29	16,320
Western pine "	34	33,980	32	82,320	18	78,840
Total	37	34,980	85	114,300	47	95,160

Defoliator	Year of Survey	Intensity of Infestation						Total	
		Light Acres	%	Moderate Acres	%	Heavy Acres	%		
Spruce budworm	1947	15,000	100.0	0	0.0	0	0.0	15,000	100
	1948	0	0.0	0	0.0	0	0.0	0	0
	1949	13,840	100.0	0	0.0	0	0.0	13,840	100
	1950	56,320	64.1	17,920	20.4	13,600	15.5	87,840	100
	1951	65,120	75.9	20,640	24.1	0	0.0	85,760	100
	1952	107,840	39.5	165,440	60.5	0	0.0	273,280	100
	1953	176,600	93.5	12,250	6.5	0	0.0	188,850	100
	1954	125,670	54.3	96,450	41.7	9,260	4.0	31,380	100



Table 3.

PERSONNEL CONDUCTING SURVEYS  
on the  
OCHOCO NATIONAL FOREST, 1947-1954

PINE BEETLE SURVEYS

1947

R. L. Anaker  
W. J. Buckhorn  
W. K. Coulter  
R. Foster  
R. L. Furniss  
R. Hobbs  
L. Phia  
C. M. Ralph  
J. F. Wear  
W. L. Webb  
J. M. Whiteside

1948

P. D. Dinehart  
B. A. Lausch  
R. G. Morgan  
J. A. Sandor  
J. M. Whiteside

1949

L. Buchholtz  
J. Holtgren  
D. F. Johnson  
R. McCartney  
E. L. Sullivan

1950

P. D. Dinehart  
H. Watson  
C. Wray

1951

H. L. Haglund  
R. P. Harrison  
P. W. Orr

1952

L. C. Dobyns  
J. Kososki  
W. F. Truax

1953

R. Glasgow  
R. Nelson  
V. V. Poole

1954

S. Benson  
L. C. Dobyns  
W. Picketts

AERIAL AND GROUND SURVEYS

1947

W. J. Buckhorn  
L. J. Sohler  
W. W. Ward

1948

W. J. Buckhorn  
J. F. Wear

1949

W. J. Buckhorn  
J. F. Wear

1950

W. J. Buckhorn  
A. T. Davidson  
J. F. Wear

1951

W. J. Buckhorn  
H. L. Haglund  
J. F. Wear

1952

W. J. Buckhorn  
A. T. Larsen  
A. Lindsten

1953

W. J. Buckhorn  
A. T. Larsen  
M. Ramsdell

1954

W. J. Buckhorn  
A. T. Larsen  
P. W. Orr





Table 4.      LIST OF FOREST INSECT REPORTS PERTAINING TO THE  
                 OCHOCO NATIONAL FOREST, 1945-1954

Buckhorn, W. J. Pine Beetle Surveys on the Ochoco National Forest,  
Season of 1945. Office Report. Dec. 5, 1945.

Defoliator Situation in the Fir Stands of Eastern Oregon and  
Washington, Season of 1947. Office Report. Feb. 18, 1948.

Furniss, R. L., W. J. Buckhorn, and K. H. Wright. The Spruce Budworm  
in Oregon and Washington, Season of 1948. Office Report. Nov. 1, 1948.

Lindsten, A., W. J. Buckhorn, J. F. Wear, J. M. Whiteside, and K. H. Wright.  
Spruce Budworm Situation in Oregon and Washington, Season of 1949.  
Mimeographed Report. Sept. 1, 1949.

Oregon State Board of Forestry. 1952 Spruce Budworm Control Project.  
Mimeographed Report. Jan. 1954.

Oregon State Board of Forestry and B. E. and P. Q. Report of Forest  
Insect Detection Surveys in Oregon and Washington, Season of 1950.  
Multilithed Report. Sept. 30, 1950.

Report of Forest Insect Detection Surveys in Oregon and Washington,  
Season of 1951. Multilithed Report. Nov. 15, 1951.

Report of Forest Insect Surveys in Oregon and Washington, Season of  
1952. Multilithed Report. Oct. 24, 1952.

Report of Forest Insect Surveys in Oregon and Washington, Season of  
1953. Mimeographed Report. Oct. 30, 1953.

Oregon State Board of Forestry and Pacific Northwest Forest and Range  
Experiment Station. Report of Forest Insect Surveys in Oregon  
and Washington, Season of 1954. Multilithed Report. Nov. 30, 1954.

Wright, K. H., A. Lindsten, and R. E. Stevens. Results of Experiments  
to Improve Techniques for Sampling Overwintering Spruce Budworm  
Populations in Oregon and Washington, Progress Report 1. Mimeo-  
graphed Report. May 20, 1952.



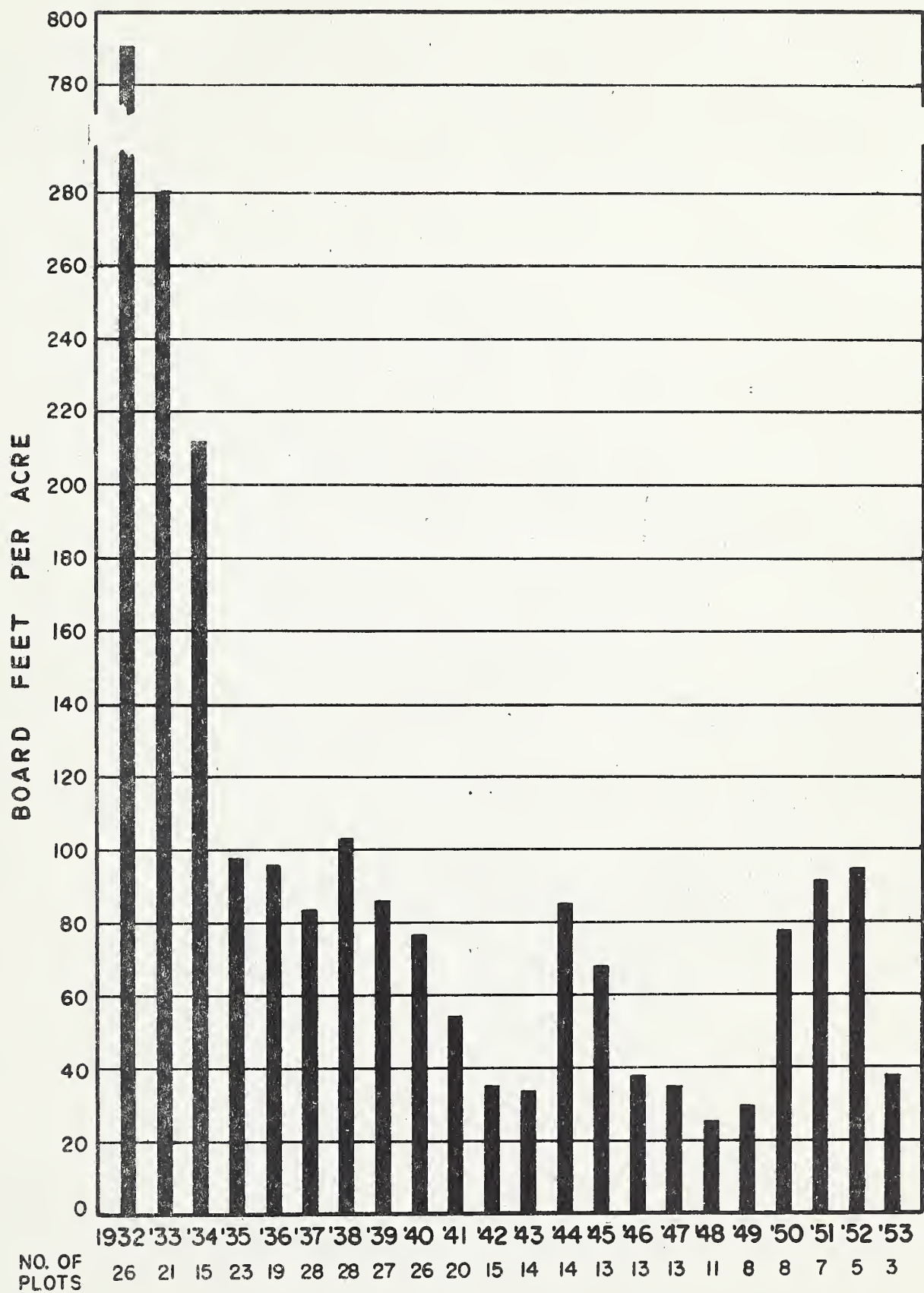


Figure No. 1 -- Trend of losses on check plots on the Ochoco N.F. and adjacent timber lands





